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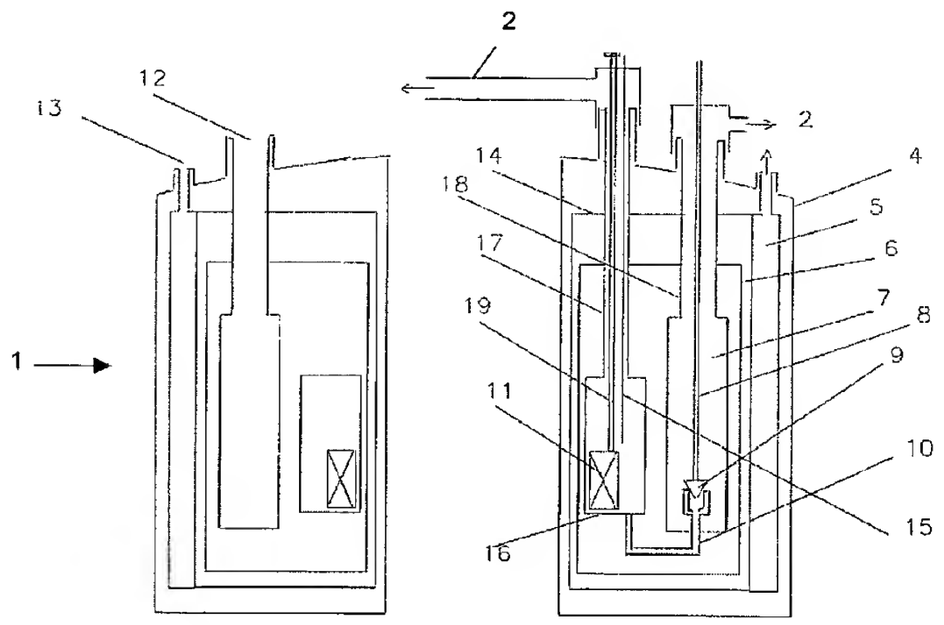
(54) Title: CRYOGENIC COOLING OF SUPERCONDUCTING MAGNET SYSTEMS BELOW TEMPERATURE OF 4 . 2 K




(57) Abstract: A superconducting magnet system comprises a cryogenic vessel (1), a superconducting magnet (11) contained in an inner reservoir (16) within the vessel (1) to be cooled by liquid helium within the inner reservoir (16), and an outer reservoir (7) containing liquid helium and linked to the inner reservoir (16) by a feed tube (10) and a needle valve (9). In operation of the system current is supplied to the magnet (11) by a removable current lead (19) extending through the wall of the vessel (1) by way of a supply passage (17) in order to initiate superconducting current flow in the magnet. The supply of current to the magnet (11) is then stopped and the lead (19) is removed whilst the superconducting current flow persists in the magnet. After an extended period of superconducting current flow in the magnet (11) and without stopping such superconducting current flow, liquid helium at a temperature of about 4.2 K may be supplied to an upper part of the inner reservoir (16) above the magnet (11) from the outer reservoir (7) such that the magnet is still surrounded by liquid helium at a temperature of below 4.2 K. After a period of time the supply of liquid helium to the inner reservoir 16 is stopped, and the liquid helium in the inner reservoir (7) is cooled to a temperature below 4.2 K. Such a system is capable of being operated at very low temperatures down to below the lambda point, and of producing magnetic fields of high strengths and stability suitable for NMR spectroscopy.

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